

1 (c) determining base at least in part on the list of frame dependencies whether a
2 decoded version of the particular frame is in a decoded frame cache, and if it is not and
3 if the particular frame has a frame dependency:

4 (i) determining a frame dependency for the particular frame;

5 (ii) determining which of the frames in the frame dependency are in the
6 decoded frame cache;

7 (iii) decoding any frame in the frame dependency that is not in the
8 decoded frame cache and placing it in the decoded frame cache; and

9 (iv) using at least one of the decoded frames in the frame dependency to
10 decode the particular frame to create a decoded version of the particular frame.

11
12 2. (Amended) The method of claim 1, wherein the request to playback a
13 particular frame is part of a request to perform frame-by-frame backward playback and
14 part (b) is performed for successively earlier frames with respect to the particular frame
15 as part of the frame-by-frame backward playback.

16
17 3. (Unchanged) The method of claim 1, wherein part (i) is performed whether
18 or not it is determined that a decoded version of a particular frame is in the decoded
19 frame cache without part (iv) being performed.

20
21 4. (Unchanged) The method of claim 1, wherein the particular frame may be
22 an I, P, or B frame of MPEG compressed video.

23
24 5. (Unchanged) The method of claim 1, wherein the frame dependency is an
25 immediate frame dependency.

26
27 6. (Amended) The method of claim 5, wherein the at least some of the
28 decoded frames referred to in part (a)-(iv) are those frames in the immediate
29 dependency.

1 7. (Amended) The method of claim 5, wherein part (b_c) includes recursion
2 where frames in the immediate frame dependency of the frame of interest are not in the
3 decoded frame cache.

4
5 8. (Amended) The method of claim 1, wherein part (b_c) includes a loop with
6 a terminating condition that all frames on which the particular frame is dependent have
7 been decoded.

8
9 9. (Unchanged) The method of claim 1, wherein decoded frames are
10 replaced in the decoded frame cache according to a least recently used policy.

11
12 10. (Unchanged) The method of claim 1, wherein an index is used to
13 represent each frame in the frame dependency.

14
15 11. (Unchanged) The method of claim 1, wherein the frame dependency is
16 determined through a look-up table.

17
18 12. (Unchanged) The method of claim 11, wherein the frame dependency is
19 determined through successive uses of a look-up table.

20
21 13. (Unchanged) The method of claim 1, wherein the decoded frame cache
22 includes a data structure.

23
24 14. (Unchanged) The method of claim 1, wherein the decoded frame cache
25 includes a section of main memory.

26
27 15. (Amended) An article comprising:
28 a computer readable medium having instructions thereon which when executed
29 cause a computer to:

30 (a) detect a request to randomly access playback a particular frame; and

1 (b) maintaining a list of frame dependencies identifying at least a set of frames
2 required to decode the particular frame;

3 (c) determine base at least in part on the list of frame dependencies whether a
4 decoded version of the particular frame is in a decoded frame cache, and if it is not and
5 if the particular frame has a frame dependency:

6 (i) determine a frame dependency for the particular frame;

7 (ii) determine which of the frames in the frame dependency are in the
8 decoded frame cache;

9 (iii) decode any frame in the frame dependency that is not in the decoded
10 frame cache and place it in the decoded frame cache; and

11 (iv) use at least and of the decoded frames in the frame dependency to
12 decode the particular frame to create a decoded version of the particular frame.

13
14 16. (Amended) The article of claim 15, wherein the request to playback a
15 particular frame is part of a request to perform frame-by-frame backward playback and
16 part (bc) is performed for successively earlier frames with respect to the particular frame
17 as part of the frame-by-frame backward playback.

18
19 17. (Unchanged) The article of claim 15, wherein part (i) is performed whether
20 or not it is determined that a decoded version of a particular frame is in the decoded
21 frame cache without part (iv) being performed.

22
23 18. (Unchanged) The article of claim 15, wherein the frame dependency is an
24 immediate frame dependency.

25
26 19. (Amended) The article of claim 18, wherein the at least some of the
27 decoded frames referred to in part (a)-(iv) are those frames in the immediate
28 dependency.

1 20. (Amended) The article of claim 18, wherein part (b_c) includes recursion
2 where frames in the immediate frame dependency of the frame of interest are not in the
3 decoded frame cache.
4

5 21. (Amended) The article of claim 15, wherein part (b_c) includes a loop with
6 a terminating condition that all frames on which the particular frame is dependent have
7 been decoded.
8

9 22. (Unchanged) The article of claim 15, wherein decoded frames are
10 replaced in the decoded frame cache according to a least recently used policy.
11

12 23. (Unchanged) The article of claim 15, wherein an index is used to represent
13 each frame in the frame dependency.
14

15 24. (Unchanged) The article of claim 15, wherein the frame dependency is
16 determined through a look-up table.
17

18 25. (Unchanged) The article of claim 24, wherein the frame dependency is
19 determined through successive uses of a look-up table.
20

21 26. (Amended) A computer system including:
22 a processor and video processing circuitry;
23 a display; and
24 memory including instructions which when executed cause the processor and
25 video processing circuitry to:

26 (a) detect a request to randomly access playback a particular frame; and

27 (b) maintain a list of frame dependencies identifying at least a set of frames
28 required to decode the particular frame;

29 (c) determine whether a decoded version of the particular frame is in a decoded
30 frame cache, and if it is not and if the particular frame has a frame dependency:

31 (i) determine a frame dependency for the particular frame;

1 (ii) determine which of the frames in the frame dependency are in the
2 decoded frame cache;
3 (iii) decode any frame in the frame dependency that is not in the decoded
4 frame cache and place it in the decoded frame cache; and
5 (iv) use at least one of the decoded frames in the frame dependency to
6 decode the particular frame to create a decoded version of the particular frame.
7 (ed) provide the decoded version of the particular frame for displaying on the
8 display.

9
10 27. (Amended) A method for randomly accessing a first frame of a video
11 stream, comprising:

12 maintaining a list of frame dependencies identifying at least a set of frames
13 required to decode the first frame;

14 determining a decoding of the first frame is not in a decoded frame cache;

15 determining, based at least in part on the list of frame dependencies, a first frame
16 dependency for the first frame comprising frames required to decode the first frame;

17 decoding at least one of the frames of the frame dependency not present in the
18 decoded frame cache, and placing it in the decoded frame cache; and

19 decoding the first frame using at least one of the decoded frames in the decoded
20 frame cache.

21
22 28. (Unchanged) The method of claim 27, further comprising:

23 decoding each frame of the frame dependency not present in the decoded frame
24 cache, and placing them in the decoded frame cache.

25
26 29. (Unchanged) The method of claim 27, further comprising:

27 recursively decoding the second frame of the frame dependency.

28
29 30. (Unchanged) A method according to claim 27 for reverse playback of
30 frames of the video stream, comprising:

DI
Cont

1 determining a second frame is not in the decoded frame cache, the second frame
2 following the first frame in the video stream;
3 determining a second frame dependency for the second frame comprising
4 frames required to decode the second frame;
5 decoding at least one of the frames of the frame dependency not present in the
6 decoded frame cache, and placing it in the decoded frame cache; and
7 decoding the second frame using at least one of the decoded frames in the
8 decoded frame cache.
9

10 31. (Unchanged) The method of claim 30, further comprising:
11 playing the second frame and then the first frame.
12

13 32. (Unchanged) The method of claim 30, wherein the second frame is an
14 immediately following frame of the first frame.
15

16 33. (Amended) An article comprising a machine-accessible media having
17 associated data for randomly accessing a first frame of a video stream, wherein the
18 data, when accessed, results in a machine performing:

19 maintaining a list of frame dependencies identifying at least a set of frames
20 required to decode the first frame;

21 determining a decoding of the first frame is not in a decoded frame cache;
22 determining, based at least in part on the list of frame dependencies, a first frame
23 dependency for the first frame comprising frames required to decode the first frame;
24 decoding at least one of the frames of the frame dependency not present in the
25 decoded frame cache, and placing it in the decoded frame cache; and
26 decoding the first frame using at least one of the decoded frames in the decoded
27 frame cache.
28

29 34. (Unchanged) The article of claim 33 wherein the machine-accessible
30 media further includes data, when accessed, results in the machine performing: